APARTMENT BUILDING

WATER USE PATTERNS

Ontario Ministry of Housing
Technical Support Services Branch

APARTMENT BUILDING WATER USE PATTERNS

An Interim Research Report

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ABSTRACT

An earlier study suggested that some water use in apartment buildings could be the result of leakage from the system.

This project, undertaken as a preliminary study to formulate strategies for future work, examined the water flows in buildings in the early morning hours. Continuous water flows were observed in two apartment buildings but it was not possible to conclusively identify the reasons for these flows.

A reduction of the continuous flows appeared to offer limited cost savings potential; further work solely in this area was not recommended, but it might be possible to combine the investigation of low flows witn other water use studies.

EXECUTIVE SUMMARY

This project examined water flows in two existing apartment buildings during early morning hours in an attempt to learn if water use continued throughout the night. If it could be established that continuous use was due to leaks from the plumbing system, correction of these problems could result in operating cost savings. The results of this preliminary study were intended to assist in the formulation of strategies for on-site monitoring activities.

This study was carried out by observing the utility water meters in the two candidate buildings on two successive mornings. Additional readings were subsequently recorded at thirty second intervals.

The results showed that water flow did not stop throughout the early morning hours. Water was used at an average minimum rate of about 5 gallons per minute. While it was not possible to demonstrate conclusively the causes for this continuous flow, it was suspected that much of the use was due to legitimate consumption by the tenants.

The recommendation of this study is that any further work on continuous water flows be carried out as part of a larger water use evaluation project. The cost for monitoring low flows will be considerable with respect to the cost savings potential. On the other hand, a project structured to analyze total water use profiles or domestic hot water use profiles, for example, could be upgraded to collect this information at marginal additional cost.

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1.0 INTRODUCTION

1.1 BACKGROUND

A study carried out by Rose Technology Group indicated that some OHC apartment buildings have high water use during early morning hours, when most occupants would be expected to have little need for water. It was postulated that much of this consumption could be attributed to leaks from the plumbing system and if the leakage could be identified and corrected, substantial operating cost savings could be realized. This interim report describes the first stage of the work - verification of continuous water use throughout the day.

1.2 OBJECTIVE

The objective of this study was to record water use patterns at two apartment buildings during early morning house. The results of the work will be used to assist in formulating the strategy for the subsequent monitoring and analysis stage.

1.3 METHOD OF APPROACH

With the cooperation of Ontario Housing Corporation staff, two buildings were selected for testing. The criteria for selection included the following:

- included in the earlier Rose Group study dated February, 1985;
- located in the Toronto area;
- availability of knowledgeable plumber;
- buildings of similar occupancy and size;
- accessible plumbing systems.

The water meter in each of the selected buildings was observed during early morning hours on two successive days. Water consumption values plotted against time indicated that the initial half-hour

readings lacked sufficient resolution for interpretation. Subsequently, water meter readings were taken at more frequent intervals.

2.0 BUILDINGS AND HEATING SYSTEMS DESCRIPTIONS

2.1 BUILDINGS DESCRIPTIONS

The two candidate buildings are located in a single complex in Scarborough, Ontario at 3171 and 3181 Eglinton Avenue East. The project, originally erected by a private developer, consists of the two apartment buildings, underground parking, two outdoor swimming pools and a wading pool. Presently owned by OHC, it is managed and operated by Metropolitan Toronto Housing Authority. (The water make-up meter had been removed for repairs and the line was capped so that there was no water consumption or leakage from the pools during the test period).

Both buildings house families; a large proportion of the adult tenants reportedly do not maintain a regular working schedule.

The easterly building, 3181 Eglinton, is a 6-storey building with 103 units including some 2-level apartments. It has seven 1-bedroom units, 14 2-bedroom units, 68 3-bedroom units, and 14 4-bedroom units, for a total of 295 bedrooms. The other building at 3171 Eglinton is 12 storeys high with 161 units in total. It contains 44 1-bedroom units, 93 2-bedroom units, and 24 3-bedroom units for a total of 302 bedrooms.

In terms of bedroom count, both buildings are very similar. If the occupancy load in each bedroom is also similar, then the total population living in the two buildings are probably very comparable.

2.2 HEATING SYSTEMS DESCRIPTION

Space heating for the complex is provided by two gas-fired Spencer Scotch marine boilers (200 and

300 boiler horsepower) located in a below-grade central boiler room adjacent to 3171 Eglinton Avenue East.

This main heating plant also provides heating water to a basement level mechanical room where domestic water for 3181 Eglinton is heated through immersion heaters installed in 2 horizontal hot water storage tanks each with a capacity of 700 gallons. To allow the main heating boilers to be turned off in summer, 4 modular gas-fired boilers located in the central plant are used as an alternative heating source for domestic water for 3181 Eglinton.

Two modular gas-fired water heaters supply the hot water requirements all year at 3171 Eglinton. Hot water storage consists of 10 vertical storage tanks of approximately 80 gallons each. Both heaters and tanks are located in the central plant.

3.0 DISCUSSION OF RESULTS

The readings were taken on the existing utility water meters: 4-inch size Neptune compound water meters. The high flow register had a multiplying factor of 100 while the low flow register had a multiplier of 10. (The high flow meter is activated when the flow rate exceeds approximately 10 gallons per minute.) In order to increase the resolution of the readings, the test dials (each divided into 10 sections) were read in addition to the registers. The registers provided accuracy within 10 gallons and test dials were used to estimate to 0.5 gallons.

The building staff suggested that many of the residents kept irregular hours. During on-site visits, estimates of the number of apartments with lights on were recorded (see Appendix). These subjective observations indicated that 20% to 30% of the windows remained lit throughout the night.

The results of the water meter readings are shown graphically on Figure 1, with a summary of the results tabulated on Figure 4. (Actual site readings are listed in the Appendix). The graphs show that the periods of low flow occurred between

3 am and 5 am. There appeared to be some substantial early morning use at 3171 Eglinton on the morning of November 8.

The November readings, taken at 30-minute and 5-minute intervals, indicated average minimum values of 6-7 gallons per minute. No periods were observed where the water flow stopped completely, or where the flow remained constant. Daily consumption in each building was about 33,000 gallons. If the observed minimum flow rate is assumed to occur throughout the whole day, it would represent about one-third of the total daily use.

To attempt to obtain a better resolution on the water use, additional recordings (see Appendix) were taken in early December at more frequent intervals; some readings were taken 30 seconds apart. The results were plotted and shown on Figures 2 and 3. In both buildings, the minimum flow observed was 5 gallons per minute, confirming the November readings. As in November, windows were observed; twenty percent of the windows were estimated to be lit during the test periods.

Accounting for this minimum flow involved some speculation, because of the preliminary nature of this investigation. It was postulated that there could be leaks in the plumbing system, or that there were legitimate water uses occurring. A cursory inspection of the mechanical equipment rooms and discussions with the operating staff failed to reveal any obvious leakage points. Continuous leaks of any magnitude would surely not go unnoticed for lengthy periods.

While it could be argued that lit windows do not correlate directly with water use, it does suggest that some people were active, and that it would not be unreasonable to expect some water flow. One person active in each lit apartment would represent 30 potential water users; it is conceivable that these people could collectively use the minimum flow of 6-7 gallons per minute, the equivalent of one or two showerheads.

4.0 CONCLUSIONS

The results of this study indicated that measurable water flow continued throughout the early morning hours in these two buildings. No periods of constant flow (which might be associated with a leaking pipe joint, for example) were detected. In fact, the December readings showed variable flows during the test periods suggesting that water was being used by the occupants. Observations of lighted windows indicated that some tenants could be active at these times.

It has not been possible to determine conclusively whether there was continuous legitimate water use by the tenants, or if there was unwarranted water leakage.

The study results indicated that both buildings have a minimum average flow rate of 5 gallons per minute occurring in the early morning.

Information received from OHC indicated that these two buildings were high water users, ranked 9 (on a scale of 10) on the OHC's Energy Consumption Reporting System (see Appendix). Annual water consumption was reported at 55,100 cubic metres (12,125,000 gallons) at 3171 Eglinton and 57,800 cubic metres (12,710,000 gallons) at 3181 Eglinton. The total water cost between July 1984 and June 1985 was $43,700. If indeed, the minimum observed flow (one-third of the total or 37,500 cubic metres or 8,300,000 gallons) was due to leakage, then $15,000 can be saved at the two buildings by identifying and eliminating these leaks.

5. RECOMMENDATIONS

A 4-inch size utility water meter does not provide sufficient accuracy for adequate measurements of minimum water flow. Accuracy can be improved by using a meter having a higher degree of resolution, or by installing smaller submeters in branch lines in the distribution system.

Smaller buildings will have smaller water requirements, a smaller water meter, and a smaller population. All these aspects tend to reduce uncertainties in the analysis of results.

The behaviour of the building population is a significant factor in this study. In order to isolate the characteristics of the plumbing system, it would be beneficial if the occupants had similar water use patterns with a least one period of no consumption during each day.

Smaller buildings will also have the added advantage of having smaller distribution systems and hence will be relatively easier to investigate to detect leaks, if it is determined that leaks do, in fact exist.

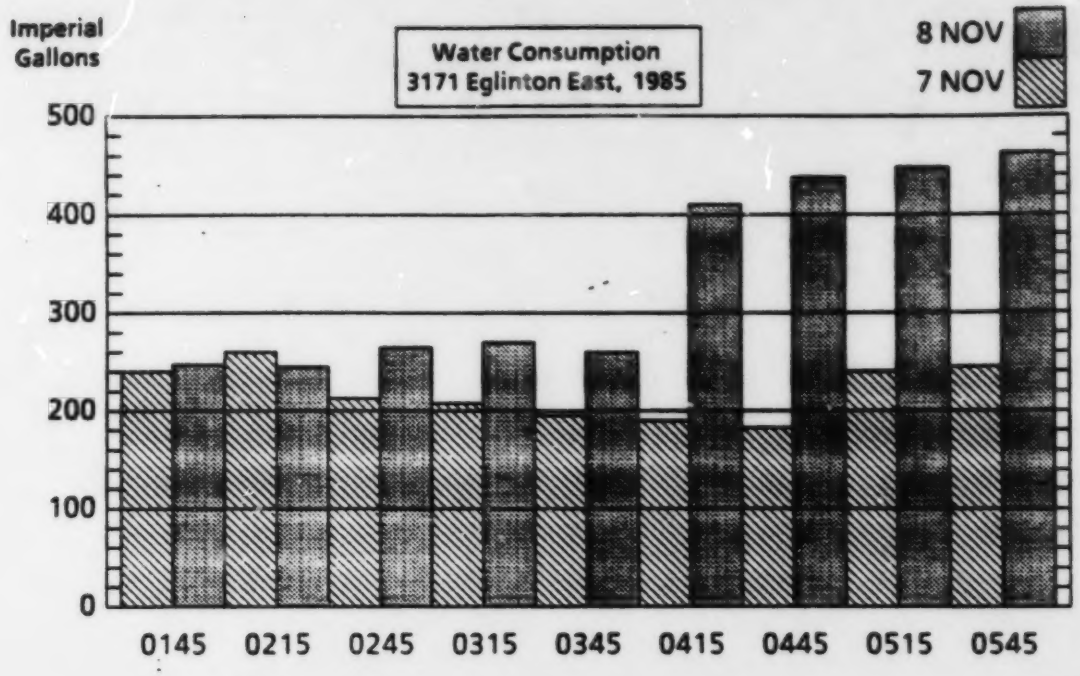
Considerable effort and expense would be required to initially set up the experiments to evaluate minimum water flows, while the potential cost savings appear to be modest. In addition, there will likely be considerable difficulty in pinpointing the cause of continuous water flows. Therefore, it is recommended that no further studies devoted solely to this subject be carried out.

This is an area worthy of further investigation, however, and it should be considered as a possible adjunct to studies of water flows and usage patterns in apartment buildings. It may be possible, for example, to examine low flow rates when hot water usage profiles are being developed. In such cases, it may be possible to justify additional marginal expenditures to analyze minimum flows.

From the point of view of determining minimum flows, this study has suggested several conditions that should be met in any subsequent long-term investigation:

- select a relatively small building with a small size water meter to make the overall task more manageable;

- select a building with one type of (relatively predictable) population; e.g., an adult building with a high proportion of tenants working during the day;
- consider the installation of submeters on branch water lines to improve accuracy of observations and to facilitate subsequent leak detection;
- availability of knowledgeable plumber familiar with the building;
- accessible plumbing systems;
- utilize data logging equipment, or a computerized data acquisition system for collection of data.


Imperial Gallons
Water Consumption
3171 Eglinton East, 1985
8 NOV
7 NOV
500
400
300
200
100
0
0145
0215
0245
0315
0345
0415
0445
0515
0545
TIME - A.M.

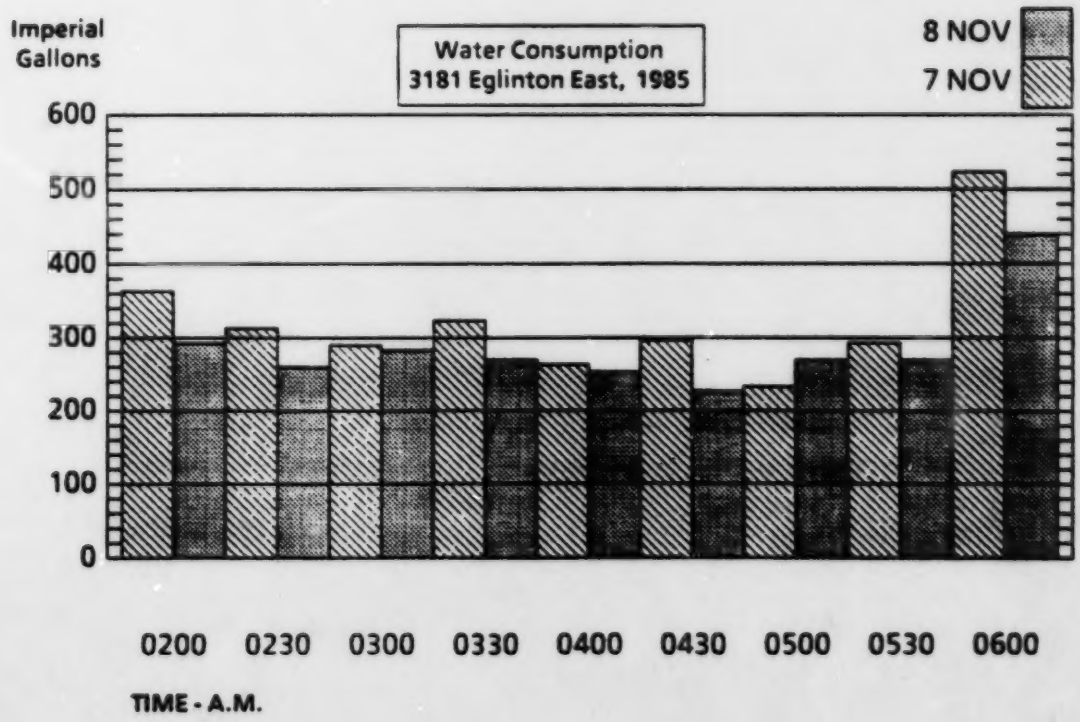
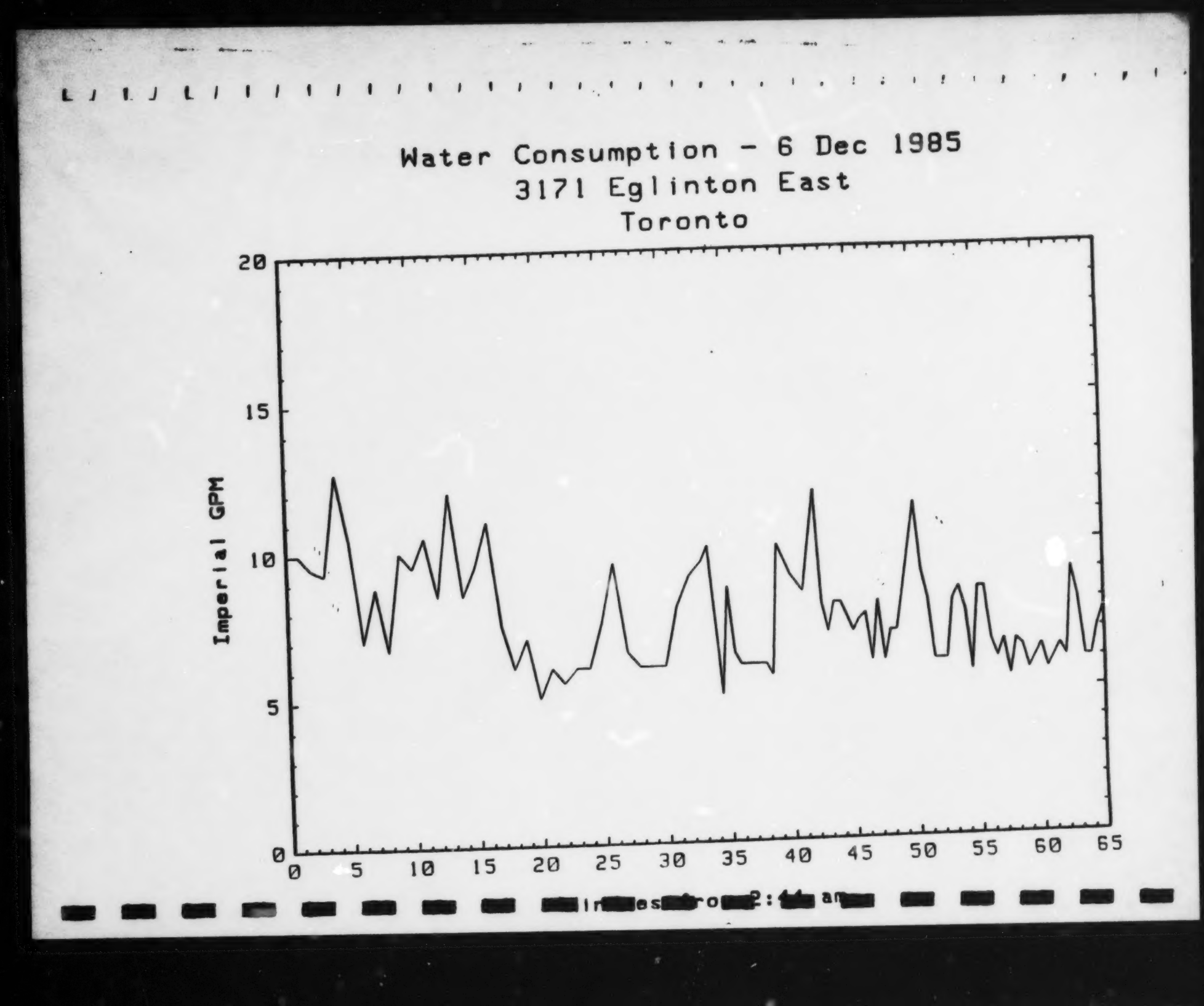

Imperial Gallons
Water Consumption
3181 Eglinton East, 1985
8 NOV
7 NOV
600
500
400
300
200
100
0
0200
0230
0300
0330
0400
0430
0500
0530
0600
TIME - A.M.

FIGURE 1


Water Consumption - 6 Dec 1985
3171 Eglinton East
Toronto
Imperial GPM
0
5
10
15
20
0
5
10
15
20
25
30
35
40
45
50
55
60
65

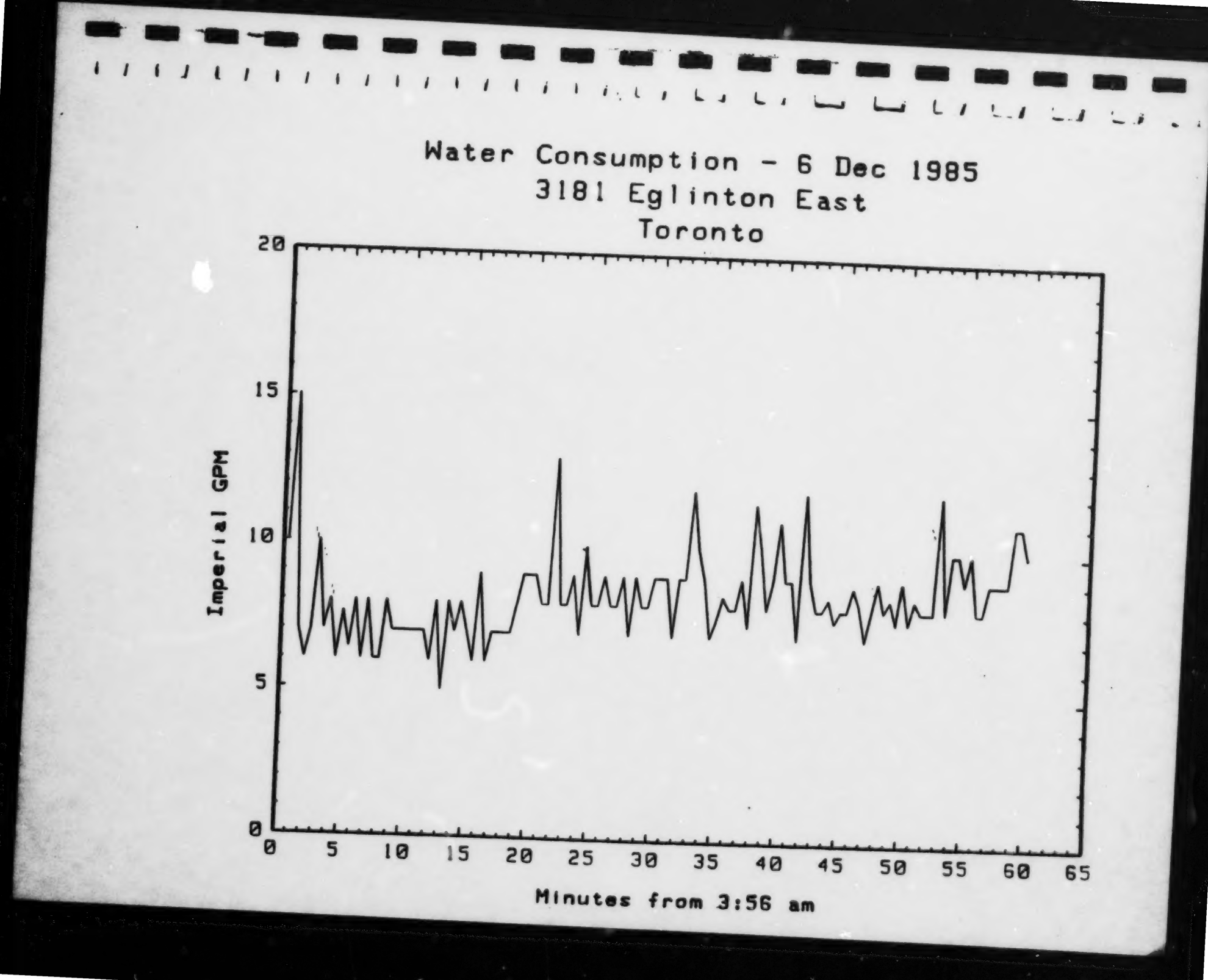

Water Consumption - 6 Dec 1985
3181 Eglinton East
Toronto
Imperial GPM
20
15
10
5
0
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Minutes from 3:56 am

FIGURE 4 SUMMARY OF RESULTS
3171 and 3181 Eglinton Avenue East

	3171 Eglinton 161 Units	3181 Eglinton 103 Units
November 7 and 8, 1985		
Average daily use - imp gal	32179	33510
- imp gal/unit	200	325
Minimum 30-minute use - imp gal	183	235
Minimum 30-minute use rate - imp gal/hour	376	470
Daily use at minimum flow rate - imp gal	9024	11280
% daily use at minimum flow rate	28.0	33.7
Minimum 5-minute use - imp gal	32	36
Minimum 5-minute use - imp gal/min	6.4	7.2
Minimum lights on, estimate %	20	30
December 6, 1985		
Minimum 30-second use - imp gal	2.50	2.50
Minimum 30-second use - imp gal/min	5.0	5.0
Minimum lights on, estimate %	20	20

APPENDIX

WATER METER READINGS

3171 Eglinton East - 7 NOV 1985

Time	Register 1 Reading	Consumption (x 100)	Register 2 Reading	Consumption (x 10)	Total Consumption	Lights on (%)
0115	1443149.20		504544.0			
0145	149.60	40	564.0	200	240	
0215	149.72	12	589.0	250	262	
0245	149.80	8	609.5	205	213	50
0315	149.90	10	629.3	198	208	
0320	149.90		633.3	40	40*	
0325	149.90		636.9	36	36*	
0345	149.90		649.0	197	197	
0350	149.95	5	652.0	30	35*	25
0355	149.95		655.3	33	33*	
0415	149.95	5	667.5	185	190	20
0420	149.95		670.8	33	33*	
0425	149.95		674.0	32	32*	
0445	149.95		685.8	183	183	
0450	149.95		689.6	38	38*	
0455	149.95		692.8	32	32*	
0515	150.20	25	707.4	216	240	50
0545	150.30	10	731.0	236	246	

* 5 minute consumption reading

WATER METER READINGS

3181 Eglinton East - 7 NOV 1985

Time	Register 1 Reading	Consumption (x 100)	Register 2 Reading	Consumption (x 10)	Total Consumption	Lights on (%)
0130	1530816.00		828539.0			
0200	818.25	225	553.0	140	365	
0230	819.30	105	574.0	210	315	
0300	819.80	50	598.0	240	290	50
0330	821.00	120	618.5	205	325	
0335	821.10	10	622.2	37	47*	40
0340	821.23	13	625.7	35	48*	
0400	821.52	52	639.9	214	266	30
0405	822.10	58	641.3	14	72*	
0410	822.70	60	642.8	15	75*	
0430	822.70	118	658.0	181	299	
0435	822.70	0	661.4	34	34*	
0440	822.70	0	665.2	38	38*	
0500	822.90	20	679.5	215	235	
0505	822.90	20	683.2	37	37*	
0510	822.90	0	687.2	40	40*	
0530	823.90	100	699.0	195	295	50
0600	828.00	410	710.4	114	525	

* 5 minute consumption reading

WATER METER READINGS

3171 Eglinton East - 8 NOV 1985

Time	Register 1 Reading	Consumption (x 100)	Register 2 Reading	Consumption (x 10)	Total Consumption	Lights on (%)
0115	1443400.15		505219.5			
0145	400.35	20	242.3	228	248	55
0215	400.47	12	265.6	233	245	
0245	401.00	53	287.0	214	267	
0315	401.30	30	311.0	240	270	
0345	401.65	35	333.7	227	262	
0350	401.90	25	337.1	34	59*	
0355	402.30	40	339.8	27	67*	
0415	404.35	270	347.7	140	410	
0420	404.92	57	349.6	19	76*	
0425	405.45	53	351.5	19	72*	
0445	407.60	325	359.1	114	439	
0450	408.20	60	361.0	19	79*	
0455	408.80	60	362.9	19	79*	60
0515	411.00	340	369.9	108	448	
0545	413.95	295	386.7	168	463	

* 5 minute consumption reading

WATER METER READINGS

3181 Eglinton East - 8 NOV 1985

Time	Register 1 Reading	Consumption (x 100)	Register 2 Reading	Consumption (x 10)	Total Consumption	Lights on (%)
0130	1531101.55		829052.0			
0200	102.40	85	073.1	211	296	
0230	102.66	26	096.7	236	262	35
0300	103.30	64	118.8	221	285	
0330	104.00	70	139.0	202	272	
0400	104.30	30	161.5	225	255	40
0405	104.30		165.1	36	36*	
0410	104.30		168.7	36	36*	
0430	104.43	13	183.1	216	229	
0435	104.43		186.7	36	36*	
0440	104.50	7	190.1	34	41*	
0500	105.15	72	203.1	200	272	
0505	105.40	25	206.0	29	54*	
0510	105.40		210.0	40	40*	
0530	105.77	62	224.0	209	271	
0535	106.15	38	227.1	31	69*	
0540	106.48	33	229.8	27	60*	
0600	108.85	308	237.4	134	442	

* 5 minute consumption reading

3171 EGLINTON AVENUE EAST
WATER CONSUMPTION - 6 DECEMBER 1985

TIME	REG 1	REG 2	IMP GAL	IGPM	TIME	REG 1	REG 2	IMP GAL	IGPM	TIME	REG 1	REG 2	IMP GAL	IGPM
244.0	810.98	639.60	NA	NA	315.0	811.18	662.85	NA	NA	334.5	811.32	677.00	NA	NA
245.0	810.99	640.50	10.00	10.00	316.0	811.18	663.75	9.00	9.00	335.0	811.32	677.40	4.00	8.00
246.0	810.99	641.45	9.50	9.50	317.0	811.18	664.70	9.50	9.50	335.5	811.32	677.70	3.00	6.00
247.0	811.02	642.08	9.30	9.30	317.5	811.18	665.20	5.00	10.00	336.0	811.32	678.00	3.00	6.00
248.0	811.07	642.85	12.70	12.70	318.0	811.18	665.50	3.00	6.00	336.5	811.32	678.30	3.00	6.00
249.0	811.08	643.80	10.50	10.50	318.5	811.18	665.75	2.50	5.00	337.0	811.32	678.70	4.00	8.00
250.0	811.08	644.50	7.00	7.00	319.0	811.18	666.18	4.30	8.60	337.5	811.32	679.12	4.20	8.40
251.0	811.08	645.38	8.80	8.80	319.5	811.18	666.50	3.20	6.40	338.0	811.32	679.50	3.80	7.60
252.0	811.08	646.05	6.70	6.70	320.0	811.18	666.80	3.00	6.00	338.5	811.32	679.78	2.80	5.60
253.0	811.09	646.95	10.00	10.00	320.5	811.18	667.10	3.00	6.00	339.0	811.32	680.20	4.20	8.40
254.0	811.09	647.90	9.50	9.50	321.0	811.18	667.40	3.00	6.00	339.5	811.32	680.62	4.20	8.40
255.0	811.10	648.85	10.50	10.50	321.5	811.18	667.70	3.00	6.00	340.0	811.32	680.95	3.30	6.60
256.0	811.10	649.70	8.50	8.50	322.0	811.18	668.00	3.00	6.00	340.5	811.32	681.25	3.00	6.00
257.0	811.15	650.40	12.00	12.00	322.5	811.19	668.28	2.80	5.60	341.0	811.32	681.58	3.30	6.60
258.0	811.15	651.25	8.50	8.50	323.0	811.20	668.58	5.00	10.00	341.5	811.32	681.85	2.70	5.40
259.0	811.17	652.00	9.50	9.50	324.0	811.21	669.38	9.00	9.00	342.0	811.32	682.18	3.30	6.60
260.0	811.18	653.00	11.00	11.00	325.0	811.22	670.12	8.40	8.40	342.5	811.32	682.50	3.20	6.40
261.0	811.18	653.75	7.50	7.50	326.0	811.28	670.70	11.80	11.80	343.0	811.32	682.78	2.80	5.60
262.0	811.18	654.75	6.00	6.00	326.5	811.28	671.10	4.00	8.00	343.5	811.32	683.08	3.00	6.00
263.0	811.19	655.48	7.00	7.00	327.0	811.28	671.45	3.50	7.00	344.0	811.32	683.40	3.20	6.40
264.0	811.18	655.85	5.30	5.00	327.5	811.28	671.85	4.00	8.00	344.5	811.32	683.68	2.80	5.60
265.0	811.18	656.18	6.00	6.00	328.0	811.28	672.25	4.00	8.00	345.0	811.32	683.98	3.00	6.00
266.0	811.18	656.73	5.50	5.50	328.5	811.28	672.95	7.00	7.00	345.5	811.32	684.30	3.20	6.40
267.0	811.19	657.70	6.00	6.00	329.5	811.28	673.32	3.70	7.40	346.0	811.32	684.60	3.00	6.00
268.0	811.18	657.90	6.20	6.00	330.0	811.28	673.70	3.80	7.60	346.5	811.32	685.05	4.50	9.00
269.0	811.19	658.65	7.50	7.50	330.5	811.28	674.00	3.00	6.00	347.0	811.32	685.45	4.00	8.00
270.0	811.18	659.60	9.50	9.50	331.0	811.28	674.40	4.00	8.00	347.5	811.32	685.75	3.00	6.00
271.0	811.19	660.25	6.50	6.50	331.5	811.28	674.70	3.00	6.00	348.0	811.32	686.05	3.00	6.00
272.0	811.18	660.85	6.00	6.00	332.0	811.28	675.05	3.50	7.00	348.5	811.32	686.40	3.50	7.00
273.0	811.18	661.45	6.00	6.00	332.5	811.28	675.40	3.50	7.00	349.0	811.32	686.78	3.80	7.60
274.0	811.18	662.05	6.00	6.00	333.0	811.28	675.82	4.20	8.40	349.5	811.32	687.22	4.40	8.80
315.0	811.18	662.85	8.00	8.00	334.0	811.32	676.55	11.30	11.30	350.0	811.35	687.80	8.80	17.60
					334.5	811.32	677.00	4.50	9.00					

Time : Recorded in minutes, beginning at 2:44am.
Register 1 : Actual initial reading 1450810(00). Multiplier 100.
Register 2 : Actual initial reading 523639(0). Multiplier 10.

8 DEC 85

OHC3181

3181 EGLINTON AVENUE EAST
WATER CONSUMPTION - 6 DECEMBER 1985

TIME	REG 1	REG 2	IMP GAL	IGPM	TIME	REG 1	REG 2	IMP GAL	IGPM	TIME	REG 1	REG 2	IMP GAL	IGPM
356.0	664.22	139.90	NA	NA	416.0	664.31	153.90	NA	NA	436.0	664.57	168.80	NA	NA
356.5	664.25	140.10	5.00	10.00	416.5	664.31	154.35	4.50	9.00	436.5	664.58	169.15	4.50	9.00
357.0	664.29	140.45	7.50	15.00	417.0	664.31	154.75	4.00	8.00	437.0	664.58	169.60	4.50	9.00
357.5	664.29	140.80	3.50	7.00	417.5	664.31	155.15	4.00	8.00	437.5	664.59	169.85	3.50	7.00
358.0	664.29	141.10	3.00	6.00	418.0	664.35	155.40	6.50	13.00	438.0	664.62	170.15	6.00	12.00
358.5	664.29	141.45	3.50	7.00	418.5	664.36	155.70	4.00	8.00	438.5	664.62	170.60	4.50	9.00
359.0	664.31	141.75	5.00	10.00	419.0	664.36	156.10	4.00	8.00	439.0	664.62	171.00	4.00	8.00
359.5	664.31	142.10	3.50	7.00	419.5	664.36	156.55	4.50	9.00	439.5	664.62	171.40	4.00	8.00
400.0	664.31	142.50	4.00	8.00	420.0	664.36	156.90	3.50	7.00	440.0	664.62	171.82	4.20	8.40
400.5	664.31	142.80	3.00	6.00	420.5	664.37	157.30	5.00	10.00	440.5	664.62	172.20	3.80	7.60
401.0	664.31	143.18	3.80	7.60	421.0	664.37	157.70	4.00	8.00	441.0	664.62	172.60	4.00	8.00
401.5	664.31	143.50	3.20	6.40	421.5	664.37	158.10	4.00	8.00	441.5	664.62	173.00	4.00	8.00
402.0	664.31	143.90	4.00	8.00	422.0	664.37	158.55	4.50	9.00	442.0	664.62	173.44	4.40	8.80
402.5	664.31	144.20	3.00	6.00	422.5	664.37	158.95	4.00	8.00	442.5	664.62	173.85	4.10	8.20
403.0	664.31	144.60	4.00	8.00	423.0	664.37	159.35	4.00	8.00	443.0	664.62	174.20	3.50	7.00
403.5	664.31	144.90	3.00	6.00	423.5	664.37	159.80	4.50	9.00	443.5	664.62	174.60	4.00	8.00
404.0	664.31	145.20	3.00	6.00	424.0	664.37	160.15	3.50	7.00	444.0	664.62	175.05	4.50	9.00
404.5	664.31	145.60	4.00	8.00	424.5	664.37	160.60	4.50	9.00	444.5	664.62	175.45	4.00	8.00
405.0	664.31	145.95	3.50	7.00	425.0	664.37	161.00	4.00	8.00	445.0	664.62	175.87	4.20	8.40
405.5	664.31	146.30	3.50	7.00	425.5	664.37	161.40	4.00	8.00	445.5	664.62	176.25	3.80	7.60
406.0	664.31	146.65	3.50	7.00	426.0	664.39	161.65	4.50	9.00	446.0	664.62	176.70	4.50	9.00
406.5	664.31	147.00	3.50	7.00	426.5	664.41	161.90	4.50	9.00	446.5	664.62	177.08	3.80	7.60
407.0	664.31	147.35	3.50	7.00	427.0	664.41	162.35	4.50	9.00	447.0	664.62	177.50	4.20	8.40
407.5	664.31	147.70	3.50	7.00	427.5	664.41	162.70	3.50	7.00	447.5	664.62	177.90	4.00	8.00
408.0	664.31	148.00	3.00	6.00	428.0	664.42	163.05	4.50	9.00	448.0	664.62	178.30	4.00	8.00
408.5	664.31	148.40	4.00	8.00	428.5	664.42	163.50	4.50	9.00	448.5	664.62	178.70	4.00	8.00
409.0	664.31	148.65	2.50	5.00	429.0	664.45	163.80	6.00	12.00	449.0	664.65	179.00	6.00	12.00
409.5	664.31	149.05	4.00	8.00	429.5	664.48	164.00	5.00	10.00	449.5	664.65	179.40	4.00	8.00
410.0	664.31	149.40	3.50	7.00	430.0	664.48	164.45	4.50	9.00	450.0	664.65	179.90	5.00	10.00
410.5	664.31	149.80	4.00	8.00	430.5	664.48	164.80	3.50	7.00	450.5	664.65	180.40	5.00	10.00
411.0	664.31	150.15	3.50	7.00	431.0	664.48	165.18	3.80	7.60	451.0	664.65	180.85	4.50	9.00
411.5	664.31	150.45	3.00	6.00	431.5	664.48	165.60	4.20	8.40	451.5	664.65	181.35	5.00	10.00
412.0	664.31	150.90	4.50	9.00	432.0	664.48	166.00	4.00	8.00	452.0	664.65	181.75	4.00	8.00
412.5	664.31	151.20	3.00	6.00	432.5	664.48	166.40	4.00	8.00	452.5	664.65	182.15	4.00	8.00
413.0	664.31	151.55	3.50	7.00	433.0	664.48	166.85	4.50	9.00	453.0	664.65	182.60	4.50	9.00
413.5	664.31	151.90	3.50	7.00	433.5	664.48	167.22	3.70	7.40	453.5	664.65	183.05	4.50	9.00
414.0	664.31	152.25	3.50	7.00	434.0	664.51	167.50	5.80	11.60	454.0	664.65	183.50	4.50	9.00
414.5	664.31	152.60	3.50	7.00	434.5	664.53	167.80	5.00	10.00	454.5	664.65	183.95	4.50	9.00
415.0	664.31	153.00	4.00	8.00	435.0	664.53	168.20	4.00	8.00	455.0	664.69	184.10	5.50	11.00
415.5	664.31	153.45	4.50	9.00	435.5	664.53	168.65	4.50	9.00	455.5	664.70	184.55	5.50	11.00
416.0	664.31	153.90	4.50	9.00	436.0	664.57	168.80	5.50	11.00	456.0	664.73	184.75	5.00	10.00

Time : Recorded in minutes, beginning at 7:56am
Register 1 : Actual initial reading 1539864(00). Multiplier 100.
Register 2 : Actual initial reading 843139(0). Multiplier 10.

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*** WATER CONSUMPTION ***
*** 3171-3181 EGLINTON AVENUE EAST ***
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Information obtained from OHC through telephone communication November 18, 1985

Reading Date	Days	3171 Cubic Metres	m3/day	3181 Cubic Metres	m3/day
26Aug85	33	4945.0	149.8	5080.1	153.9
24Jul85	33	5411.8	164.0	5467.1	165.7
21Jun85	28	4901.2	175.0	4685.2	167.3
24May85	29	4862.4	167.7	4982.1	171.8
25Apr85	34	4928.5	145.0	5477.8	161.1
22Mar85	28	4037.2	144.2	4471.4	159.7
22Feb85	29	4080.9	140.7	4096.4	141.3
24Jan85	35	4932.0	140.9	5344.0	152.7
20Dec84	27	3901.7	144.5	4162.9	154.2
23Nov84	30	4401.7	146.7	4577.9	152.6
24Oct84	30	4410.6	147.0	4613.1	153.8
24Sep84	31	4510.3	145.5	4888.5	157.7
24Aug84	32	6056.2	189.3	5421.7	169.4
23Jul84	32	4090.9	127.8	5050.4	157.8
Jul-Jun	365.0	55113.6	151.2	57771.4	158.3
	Gal/day		33262.7		34821.7
	Cost - 2 buildings				$43739.00
21Jun84	28	4090.9	146.1	4532.8	161.9
24May84	30	4485.0	149.5	4787.0	159.6
24Apr84	32	4698.3	146.8	5457.3	170.5
23Mar84	31	4576.1	147.6	4984.1	160.8
21Feb84	28	3923.5	140.1	6350.9	226.8
24Jan84	33	4673.4	141.6	5375.4	162.9
21Dec83	29	3874.2	133.6	4578.2	157.9
22Nov83	31	4409.8	142.3	5348.0	172.5
21Oct83	29	4107.3	141.6	5174.3	178.4
22Sep83	31	4446.3	143.4	6034.4	194.7
22Aug83	31	4171.3	134.6	5070.2	163.6
25Jul83	31	5484.8	176.9	5869.1	189.3
Jul-Jun	364.0	52940.9	145.3	63561.7	174.9
	Gal/day		31976.6		38478.5